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OIL SHALE, TAR SANDS, AND THE DEFINITION OF A MINERAL: AN OLD PROBLEM IN A NEW CONTEXT

Debra Dobray*

I. INTRODUCTION

In the last year, our nation witnessed a sharp decline in the cost of fuel. As a result, domestic production has been curtailed. Many “stripper” wells, wells which are not economically successful, have been capped. Arguably, those potential fuel sources will be lost forever. Although the oil and gas industry is currently experiencing an economic downturn, it is imperative that our nation proceed with the development of energy resources for several reasons. The political and military instability of the Middle East oil-producing nations could result in a supply shortage similar to the shortage which occurred in the 1970’s. A disruption in the supply of oil imports could cause serious problems in our domestic economy and for our national security. Independence from foreign energy sources would avert these potential problems. Additionally, increased domestic production, coupled with a decrease in foreign imports, would diminish our current trade deficit. Presently, many national leaders advocate exporting coal and Alaskan oil to Japan and other

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energy-hungry nations of newly industrialized East Asia.¹ Expanding production could also alleviate some domestic unemployment and strengthen the tax base in the areas where the industry is located.

Oil shale and tar sands represent significant sources of fuel for the United States. The development of these sources will be thwarted somewhat by the dissolution of the Synthetic Fuels Corporation. However, these valuable resources should not be forgotten, capped like stripper wells. Domestic shale production has the potential to exceed import levels for decades. It is a secure domestic resource which could free the nation from dependence on foreign oil in the future.² As a practical matter, our nation must not be short-sighted. An energy crisis was an unpredicted event in the 1970's. Such a crisis could redevelop as quickly as the price of oil has declined.

Our legal system should be prepared to meet this challenge as well. One potential legal problem on the horizon in the development of oil shale and tar sands is the classification of ownership rights. There has been much controversy and litigation surrounding the definition of a mineral when the mineral estate has been severed and exists independently from the surface estate. The question of who owns a particular substance, the mineral or surface estate owner, often arises in the development of that substance.

II. THE NATURE, EXTENT, AND DEVELOPMENT OF OIL SHALE AND TAR SAND DEPOSITS

Oil shale is a solid material which contains an organic substance, kerogen, which can be converted to a liquid through the application of heat.³ Tar sands are consolidated or unconsolidated rocks which contain some form of bituminous material which can be separated from the sand.⁴ The United States supported an oil shale industry until the development of the oil well as a low cost means of fuel production in the mid-

1. See Lachica, *Reagan May Sell Alaskan Crude to the Japanese*, Wall St. J., Oct. 28, 1985, at 26, col. 4.

2. D. RUBENSON & R. PEI, *OIL SHALE IN THE PICEANCE BASIN, AN ANALYSIS OF LAND USE ISSUES* (1983) [hereinafter cited as RUBENSON]. One tar sands project of the Greenwich Oil Company in north Texas could add 10 billion barrels of crude to the nation's reserves by the end of the year. Landers, *Synthetic Fuels Endeavor Leaves Undetermined Legacy*, The Dallas Morning News, Jan. 15, 1986, at 1, col. 3.

3. RUBENSON, *supra* note 2, at 1-2.

4. NATIONAL RESEARCH COUNCIL, COMMISSION ON NATURAL RESOURCES, *SURFACE MINING OF NON COAL MINERALS, APPENDIX II: MINING AND PROCESSING OF OIL SHALE AND TAR SANDS*, 148 (1980) [hereinafter cited as APPENDIX II].

nineteenth century.⁵ Several other countries, such as Scotland, Spain, Sweden, France, and Australia, have also had oil shale industries. The U.S.S.R. and the People's Republic of China still produce shale oil commercially, some of which is refined to produce liquid fuels, and some of which is burned as a solid to generate electric power.⁶

Oil shale deposits blanket a large part of the United States. The Black Devonian Mississippi oil shales cover about 17,000 square miles in the Ohio, Michigan, and Appalachian Basins, and contain a potential yield of four hundred billion barrels of oil.⁷ The richest shales are in the Green River formation of Colorado, Utah, and Wyoming.⁸ This three-state area has an estimated production yield of two trillion barrels of oil.⁹ The richest tar sands are in Utah, and contain an estimated production yield of two billion barrels of oil.¹⁰

The federal government owns approximately eighty percent of the western shale lands.¹¹ The remaining lands are owned by states, Indian tribes, and private interests.¹² Most of the privately owned property is controlled by oil companies.¹³ The primary companies involved in oil shale development are Chevron, Occidental Petroleum, Tenneco, and Connoco or their oil shale company subsidiaries.¹⁴ The development of privately owned shale lands might be more lucrative and practical now

5. RUBENSON, *supra* note 2, at 2.

6. 16 ENCYCLOPEDIA OF CHEMICAL TECHNOLOGY 346 (3d ed. 1981) [hereinafter cited as CHEMICAL TECHNOLOGY].

7. BOOZ • ALLEN & HAMILTON INC., SURVEY OF EASTERN OIL SHALE ISSUES AND ACTIVITIES (1980) [hereinafter cited as SURVEY]. The shales of the greatest economic significance, because of their high oil content, are in Kentucky and central Tennessee. Other eastern states with shale deposits include Indiana, Illinois, Michigan, Missouri, Ohio, Alabama, Arkansas, Pennsylvania, and New York. The Pennsylvania and New York shales, however, yield small amounts of oil per ton of shale. Generally, the eastern shales are thin deposits spanning large areas of land. As a result, a commercial size mining facility would have to be quite large. Nevertheless, if developed, these shales could be a valuable source of light petroleum products given their chemical content. *Id.*

8. CHEMICAL TECHNOLOGY, *supra* note 6, at 333.

9. Duncan, *Oil Shale Mining Claims: Alternatives for Resolution of an Ancient Problem*, 17 LAND & WATER L. REV. 1, 5 (1982). However, some experts speculate that the Wyoming deposits are of insufficient quality to be developed economically. RUBENSON, *supra* note 2, at 5.

10. APPENDIX II, *supra* note 4, at 159. Other principal tar sand states are Alabama, California, Kansas, Kentucky, Missouri, New Mexico, Ohio, Texas, and Utah. However, there are still technological problems which preclude tar sand development in the near future and lead some analysts to conclude that the estimated yield is inflated. *Id.* at 158.

11. Israel, *Colorado Oil Shale Development in the 1980's*, 9 COLO. LAW. 2077 (1980).

12. APPENDIX II, *supra* note 4, at 50.

13. The key issue in such "control," however, is: What do the companies own? Chevron owns a substantial amount of the acreage in fee although some of the acres are mineral only or surface only properties. Letter from G. E. Bishop, Chevron Shale Oil Company, to author (October 25, 1985) (discussing Chevron Shale Oil Properties). Such partial ownership could result in ownership rights disputes when these properties are developed. See *infra* notes 50-111 and accompanying text.

14. Other major companies involved in the development of western shales include Mobil, Supe-

given the current regulations applicable to federal lands which limit the lease size, prohibit off-site waste disposal, and restrict each developer to one lease.¹⁵ Private parties own the majority of the eastern shales which cover a vast area.

Oil from shale is produced by a six step process. The shale must be mined, crushed, hauled, retorted, upgraded, and finally transported. Surface mining methods such as strip mining and open pit mining are appropriate when shale is near the surface.¹⁶ Tar sands also may be developed through surface mining.¹⁷ Underground mining is another alternative, of which room and pillar mining is the traditional method.¹⁸ After being mined, the shale is fractured to increase the efficiency of the retorting process, and then hauled to the retort site.¹⁹ Retorting involves extracting oil from shale through the application of heat. Often this process is conducted at the surface.²⁰ However, alternate methods of production are becoming available as well. In the modified in situ approach, a fraction of the oil shale is mined by an underground method and the remaining is crushed into rubble with explosives to create permeability, thus allowing the rubble to be retorted in place.²¹ True in situ retorting involves placing explosives in the shale seam by wells, detonating the explosives, and retorting the shale in place horizontally.²² After

rior, Exxon, Arco, Texaco, Shell, Union, Sohio, and Getty. Lewis, *Oil from Shale: The Potential, the Problems, and a Plan for Development*, 5 ENERGY 373, 374-75 (1980).

15. See RUBENSON, *supra* note 2, at 14-35. The Mineral Leasing Act of 1920 governs the development of federally owned land. A full discussion of its provisions and their application to oil shale is beyond the scope of this article. However, just as this legislation tends to restrict developers to a degree, the government has at its power the means of encouraging the resource's development through tax incentives, such as accelerated depreciation and investment and production tax credits, purchase agreements, and loan guarantees. CHEMICAL TECHNOLOGY, *supra* note 6, at 348.

16. SYNTHETIC FUELS CORPORATION, COMPREHENSIVE STRATEGY REPORT (1985) [hereinafter cited as REPORT]. In either process, first the topsoil is removed, then the overburden is removed generally through drilling or blasting. NATIONAL CONFERENCE OF STATE LEGISLATURES, GUIDE TO OIL SHALE (1981) [hereinafter cited as GUIDE].

17. Tar sands in Canada are produced through surface mining. This method is less expensive than underground mining and is feasible where the overburden is not too thick. APPENDIX II, *supra* note 4, at 157-158.

18. This technique involves the excavation of underground tunnels. GUIDE, *supra* note 16, at 4. Eastern shales may be recoverable only by using underground methods. SURVEY, *supra* note 7, at II-3.

19. GUIDE, *supra* note 16, at 6. Hoists, conveyors, rail systems, pipelines, and trucks are suitable for hauling oil shale depending on the terrain. *Id.*

20. *Id.* at 7.

21. CHEMICAL TECHNOLOGY, *supra* note 6, at 341. See also GUIDE, *supra* note 16, at 5; REPORT, *supra* note 16, at 32-33; APPENDIX II, *supra* note 4, at 157.

22. REPORT, *supra* note 16, at 33. In situ retorting is a difficult process because of the shale's low permeability. However, if it can be accomplished successfully, it alleviates many of the problems of mining, particularly in disposing of the waste. CHEMICAL TECHNOLOGY, *supra* note 6, at 341. Other experimental methods of in situ retorting are the microwave heating of oil shale and the

retorting, the shale oil must be upgraded before it can be used as a substitute for crude oil.²³ Several problems emerge in conjunction with this total process. Since shale and tar sands expand when retorted, there is a great volume of spent material which must be discarded.²⁴ Moreover, the process requires a large amount of water along with a substantial capital investment in facilities.

Examining the process of producing oil from shale helps to depict the resource's characteristics. In what other ways can the substance's qualities be explained? Basically, oil shale is a sedimentary rock containing organic material from which oil can be produced.²⁵ However, it does not really contain petroleum, nor is it necessarily a true shale. The energy source it yields is a black, waxy oil which in addition to carbon and hydrogen, contains nitrogen, oxygen, and sulphur.²⁶ Western shale is in fact a marlstone, or type of limestone, composed of calcium, magnesium carbonates, dolomite, and quartz.²⁷ In contrast, eastern shale is a true marine shale composed of iron, aluminum, potassium, magnesium, and silicon clay.²⁸ Other minerals found in association with shale, and which may be recoverable, are dawsonite, a source of aluminum, and nahcolite, a source of soda ash.²⁹ Additionally, eastern shales have the potential to yield cobalt, nickel, and uranium.³⁰ Thus, oil shale contains minerals and its end product after refinement is oil fuel. In another sense, though, shale is merely a conglomeration of rocks, large amounts of which must be crushed and processed in order to yield oil and other mineral by-products.³¹ Is shale then, legally, a part of the mineral or the surface estate?

injection of steam into tar sands. See REPORT, *supra* note 16, at 33; APPENDIX II, *supra* note 4, at 155-157. Another process particularly suitable for eastern shales has been tested recently. This process, "hytort," involves retorting the shale in a hydrogen, rather than the conventional air environment. If successful on a large scale, it could greatly enhance organic carbon recovery. See SURVEY, *supra* note 7, at III-20.

23. RUBENSON, *supra* note 2, at 3. Refining crude shale oil is more costly than petroleum crude because of the former's high nitrogen content. CHEMICAL TECHNOLOGY, *supra* note 6, at 342, 345.

24. McCloskey, *The Environmental Impacts of Synthetic Fuels*, 2 J. ENERGY L. & POL'Y 1, 8-9 (1981).

25. Duncan, *supra* note 9, at 4.

26. Jaffee, 5 *Mineral Industries Bulletin* (Colorado School of Mines 1962). Tar sands, on the other hand, actually are rocks impregnated with oil. *Id.* Query whether for purposes of determining if either resource belongs to the mineral or surface estate, this distinction should be significant. See notes 46-47 *infra* and accompanying text.

27. Duncan, *supra* note 9, at 4.

28. SURVEY, *supra* note 7, at I-11.

29. Israel, *supra* note 11, at 2089. See also CHEMICAL TECHNOLOGY, *supra* note 6, at 342.

30. See SURVEY, *supra* note 7.

31. See *supra* text accompanying notes 16-24.

An examination of how courts have classified other substances similar to shale will aid in an attempt to resolve this question.

III. A SURVEY OF THE LEGAL CLASSIFICATIONS OF SIMILAR SUBSTANCES

From a legal perspective, it is important to classify shale as being a part of either the mineral or the surface estate for the purpose of determining ownership rights to develop the resource.³² Generally, under the common law, mines and mining rights belong to the owner of the fee estate, who may sever the fee and convey or reserve either the surface or the mineral estate.³³ In interpreting such grants or reservations, courts have not limited the term "minerals" to metallic substances.³⁴ Although some state statutes provide limited guidance to courts called upon to interpret the ambiguous term "minerals" in a grant or reservation,³⁵ often courts are required to clarify the term with little assistance.

An analysis of how courts have classified substances similar to shale, tar sands, and their by-products should aid in predicting how courts will classify shale and tar sands.³⁶ Before shale is mined, crushed, and re-torted, it is very similar to rock or stone, both of which have been held to be minerals.³⁷ Western shale, in particular, exhibits qualities similar to

32. For a discussion of other reasons for defining the substance as being a mineral or not being a mineral, see Reeves, *The Meaning of the Word "Minerals,"* 54 N.D.L. REV. 419, 424-26 (1978).

33. In other countries, mines belong to the sovereign. In the United States as well, during colonial time, the right to mine gold and silver belonged to the sovereign. This exception followed the "royal mines" doctrine of the common law. Lopez, *Upstairs/Downstairs: Conflicts Between Surface and Mineral Owners*, 26 ROCKY MTN. MIN. L. INST. 995, 996-1007 (1980). The ownership rights of the sovereign under Mexican law was a factor the Texas Supreme Court considered in deciding whether a reservation of minerals to the state included coal. *Schwartz v. State*, 703 S.W.2d 187, 190 (Tex. 1986), *aff'd* 658 S.W.2d 822 (Tex. Civ. App. 1983).

34. *United States ex rel. Tennessee Valley Auth. v. Harris*, 115 F.2d 343, 344 (5th Cir. 1940). Under the system of land classification used by the government at the beginning of this century, public lands, which could be conveyed as land grants, were classified as being either mineral or non-mineral depending on whether the land was more valuable for agricultural or mining purposes. See *Watt v. Western Nuclear, Inc.*, 462 U.S. 36, 47-8 (1983). For a discussion of this classification system, see Reeves, *The Origin and Development of the Rules of Discovery*, 8 LAND & WATER L. REV. 1, 21-26, 28-30 (1973). Now there are certain regulations which address the definition of a mineral under mining laws. However, these provisions are of limited application to this discussion.

35. For a survey of state statutes which have limited the word "minerals" as used in private conveyances and in other contexts, see Reeves, *supra* note 32, at 438-40, 483-89.

36. For a discussion of how specific substances have been classified, see Reeves, *supra* note 32, at 463-76. Some substances present in shale, such as carbonate of soda, have been held to be minerals. *Id.* at 476.

37. *Jeffrey v. Spruce-Boone Land Co.*, 112 W. Va. 360, 164 S.E.2d 292, (1932) (pulp stone included in conveyance of "all the coal and mineral" [sic]). Other courts have not concluded that rock is included in a grant of minerals. See *Steinman Dev. Co. v. W. M. Ritter Lumber Co.*, 290 F. 832 (W.D. Va. 1922), *aff'd*, 290 F. 841 (4th Cir. 1923); *Wulf v. Shultz*, 211 Kan. 724, 508 P.2d 896 (1973); *Winsett v. Watson*, 206 S.W.2d 656 (Tex. Civ. App. 1947).

those of limestone, sandstone, and even granite. The decisions are not uniform regarding whether these substances constitute minerals,³⁸ although generally courts do not consider them to be included in a grant or reservation of the mineral estate. Eastern shale is partially composed of silicon clay, and clay has been held to be a mineral.³⁹ Both eastern and western shales, as well as tar sands, may be likened to sand and gravel. A broad interpretation of the word minerals would encompass sand and gravel, yet most judicial interpretations exclude these substances.⁴⁰ However, the Supreme Court held in *Watt v. Western Nuclear, Inc.*⁴¹ that gravel found on lands covered by the Stock-Raising Homestead Act of 1916 is a mineral reserved to the United States under the act.⁴²

Thus, determining whether shale is a mineral by analogizing it to

38. See, e.g., *Kalberer v. Grassham*, 282 Ky. 430, 138 S.W.2d 940 (1940) (grant of "all the minerals of every kind and character" includes sandstone); *Heinatz v. Allen*, 147 Tex. 512, 217 S.W. 2d 994 (1949) (limestone not included in a devise of "the mineral rights"); *Southern Title Ins. Co. v. Oller*, 268 Ark. 300, 595 S.W.2d 681 (1980) (chalk, a form of limestone, not a mineral within the exclusionary clause of a title insurance policy since its production would destroy the surface); *Kinder v. La Salle County Carbon Coal Co.*, 310 Ill. 126, 141 N.E. 537 (1923) (limestone not included in deed of "all the rights in or title to the oil and minerals, of every description"); *Brady v. Smith*, 181 N.Y. 178, 73 N.E. 963 (1905) ("all mines and minerals" did not include limestone when land was largely covered with limestone and granite); see also *Campbell v. Tennessee Coal, Iron & R.R.*, 150 Tenn. 423, 265 S.W. 674 (1924) (reservation of "all the mines or minerals" does not include limestone which comprised the general surface of the land); *Beury v. Shelton*, 151 Va. 28, 144 S.E. 629 (1928) (limestone not included in a mineral reservation where land located in "limestone country"). But see *Armstrong v. Lake Champlain Granite Co.*, 147 N.Y. 495, 42 N.E. 186 (1895) (granite, because of its value, included in a grant of "minerals").

39. *Cole v. McDonald*, 236 Miss. 168, 109 So. 2d 628 (1959) (clay included in grant of "oil, gas or other minerals" absent evidence that the parties intended to limit the broad term). But see *Hans v. Great Bend Brick & Tile Co.*, 172 Kan. 478, 241 P.2d 475 (1952) (clay not included in conveyance of "oil, gas, and other minerals" given the position of the parties and the substance of the transaction).

40. See, e.g., *State ex rel. Commissioners of Land Office v. Hendrix*, 196 Okla. 596, 167 P.2d 43 (1946); *LaRowe v. McGee*, 171 Ga. 771, 156 S.E. 591 (1931) (case decided on other grounds); *State Land Bd. v. State Dep't of Fish and Game*, 17 Utah 2d 237, 408 P.2d 707 (1965); *Hendler v. Lehigh Valley R.R.*, 209 Pa. 256, 58 A. 486 (1904); *Farrell v. Sayre*, 129 Colo. 368, 270 P.2d 190 (1954); *Beck v. Harvey*, 196 Okla. 270, 164 P.2d 399 (1944); *Praetorian Diamond Oil Ass'n v. Garvey*, 15 S.W.2d 698 (Tex. Civ. App. 1929) (mineral lease); *Shell Petroleum Corp. v. Liberty Gravel & Sand Co.*, 128 S.W.2d 471 (Tex. Civ. App. 1929); *Winsett v. Watson*, 206 S.W.2d 656 (Tex. Civ. App. 1947); *Harper v. Talladega County*, 279 Ala. 365, 185 So. 2d 388 (1966); *Bambauer v. Menjoulet*, 214 Cal. App. 2d 871, 29 Cal. Rptr. 874 (1963); see also *Reeves, supra* note 32, at 433-34, 472-73. But see *United States v. 1,253.14 Acres of Land*, 455 F.2d 1177 (10th Cir. 1972) (reservation of "all minerals, including oil and gas," included sand and gravel deposits).

41. 462 U.S. 36 (1983).

42. The Court noted that the dictionary meaning of minerals was not useful in resolving the issue, nor was the scientific classification of gravel as an inorganic substance. *Id.* at 43. Rather, the Court resolved that gravel should be treated as a mineral under the Stock-Raising Homestead Act of 1916 as it was under the general mining laws. *Id.* at 59. However, the dissent argued that Congress did not intend to reserve commonplace inorganic substances that constituted part of the soil of the patented land. *Id.* at 71-2 (Powell, J., dissenting).

similar substances previously considered by courts yields no definitive conclusion. Some courts have addressed the ownership of shale itself, but again, have reached no uniform resolution.⁴³ The classification of its by-products is not settled either. For example, uranium might be recoverable from eastern shale, but the decisions are not consistent as to whether uranium should be classified as a mineral.⁴⁴ Courts have not even been able to agree on the classification of shale's and tar sand's final product, oil. In interpreting the term "minerals" in a reservation or grant, courts generally consider oil and gas to be included⁴⁵ even though both substances are organic and lack a definite chemical composition. However, unlike the petroleum produced from porous sands, shale oil is solid in its natural state and must undergo considerable processing before oil is produced.⁴⁶ This distinction is the reason it is commonly referred to as a synthetic fuel.⁴⁷ While water generally is not considered to be a mineral nor a part of the mineral estate,⁴⁸ some courts recently have reasoned

43. See *McCombs v. Stevenson*, 154 Ala. 109, 44 So. 867 (1907) (absent a contrary intent, reservation of "all coal, ores and other minerals" included shale, a substance sought and removed for its intrinsic value). *Contra Atwood v. Rodman*, 355 S.W. 2d 206 (Tex. Civ. App. 1962) (reservation of "oil, gas and other minerals" did not reserve limestone, caliche, or surface shale), *writ ref'd*.

44. *Dawson v. Meike*, 508 P.2d 15 (Wyo. 1973) (reservation of "oil, gas, and kindred minerals" did not reserve uranium). *Contra Moser v. United States Steel Corp.*, 676 S.W.2d 99 (Tex. 1984) (uranium is held by the owner of the mineral estate as a matter of law). For a consideration of the *Moser* case, see *infra* notes 104-109, 116-117 and accompanying text.

45. See, e.g., *Luse v. Boatman*, 217 S.W. 1096 (Tex. Civ. App. 1919), *writ ref'd*; *Elliott v. Nelson*, 113 Tex. 62, 251 S.W. 501 (1923); *Anderson & Kerr Drilling Co. v. Bruhlmeier*, 134 Tex. 574, 136 S.W.2d 800 (1940). See also *Ozark Chemical Co. v. Jones*, 125 F.2d 1 (10th Cir. 1941), *cert. denied*, 316 U.S. 695 (1942) and cases cited at 6-7 n.11; *Reeves*, *supra* note 32, at 466-67. *But see Dunham v. Kirkpatrick*, 101 Pa. 36, 47 Am. Rep. 696 (1882) (oil not included in a reservation of all minerals); *Huie Hodge Lumber Co. v. Railroads Land Co.*, 151 La. 197, 91 So. 676 (1922) (reservation of "iron, coal and other minerals" embraced only solid minerals and not oil and gas).

46. See *supra* text accompanying notes 16-24.

47. For an interesting analysis of this issue, compare *Morgan v. Utah Bd. of State Lands*, 21 Utah 2d 364, 445 P.2d 776 (1968) with *Utah Resources Int'l v. Utah Bd. of State Lands*, 26 Utah 2d 342, 489 P.2d 615 (1971). In *Morgan*, the court was faced with the task of interpreting a legislative amendment. The court enjoined the Board of State Lands from entering into an oil and gas lease where there was already in existence a "bituminous sand lease," concluding that the oil recoverable under the bituminous sand lease was the same mineral recoverable under an oil and gas lease. However, in *Utah Resources*, the court refused to enjoin the Board from issuing an oil shale lease on land subject to an "oil, gas and hydrocarbon lease" which excluded oil shale. The court noted an interesting, although somewhat dubious, distinction between petroleum and oil shale:

[I]t is evident that oil and gas, and bituminous sands leases have to do with a mineral in place containing an identical substance, while an oil shale lease does not cover that same substance, and that two separate minerals are involved. Gas and oil leases historically have been considered mineral, as have oil shale leases, and we are inclined to the opinion and we conclude that each is a "license to hunt" for the minerals in their natural state and not a fishing license for an end product that might be oil, coal oil, synthetic fuel or lubricants, diamonds, nylons, cosmetics or other items of a purely synthetic nature.

Utah Resources, 489 P.2d at 617.

48. See, e.g., *Sun Oil Co. v. Whitaker*, 483 S.W.2d 808 (Tex. 1972); *Robinson v. Robbins Petroleum Corp.*, 501 S.W.2d 865 (Tex. 1973); *Vogel v. Cobb*, 193 Okla. 64, 141 P.2d 276 (1943). How-

that geothermal steam and its fluid content constitute a mineral because the function of this resource duplicates that served by oil, gas, and coal.⁴⁹ Courts might take this approach in determining the nature of oil shale and include shale in a grant of "minerals".

IV. JUDICIAL PRINCIPLES GOVERNING THE INTERPRETATION OF THE WORD "MINERALS"

Examining the classification of substances on a mineral by mineral basis fails to reveal how courts will treat future controversies concerning whether oil shale or tar sands belong to the surface or the mineral estate. Courts often employ rules of construction to reach their ultimate conclusions. Additionally, courts seem to base many of their decisions on principles touched by public policy implications. The following discussion will examine these guidelines with respect to their application to these new resources.

A. *Universal Terms*

Generally, courts refuse to view universal terms, such as "all," "of every kind," "of any kind," or "of every description," which accompany the word "minerals" in a conveyance, as expanding the mineral estate to encompass any substance which arguably might be "mineral" in nature.⁵⁰ Likewise, a conveyance which uses a combination of such words as "in," "on," or "under" apparently neither broadens nor restricts the court's definition.⁵¹ On the other hand, courts will use rules of construction to define the term "minerals" in ambiguous conveyances. In some cases where the instrument could reasonably be interpreted as either including or excluding the substance in question, courts have deferred to the rule of construction which requires that the instrument be construed against the grantor,⁵² although usually this rule is merely an influential

ever, under the Louisiana Mineral Code, which has its genesis in the civil law, subterranean water is considered a mineral. LA. REV. STAT. ANN. § 31.4 (West 1975).

49. See, e.g., *United States v. Union Oil Co. of Cal.*, 549 F.2d 1271 (9th Cir.), cert. denied, *Ottoboni v. United States*, 434 U.S. 930 (1977). For a comprehensive discussion of the classification of geothermal resources, see Olpin, Tarlock & Austin, *Geothermal Development and Western Water Law*, 1979 UTAH L. REV. 773 (hereinafter cited as Olpin).

50. See Reeves, *supra* note 32, at 477, 481-82.

51. *Id.* at 479-80.

52. See, e.g., *McCombs v. Stephenson*, 154 Ala. 109, 44 So. 867 (1907); *Beury v. Shelton*, 151 Va. 28, 144 S.E. 629 (1928); *Campbell v. Tennessee Coal, Iron & R.R.*, 150 Tenn. 423, 265 S.W. 674 (1924). In Louisiana, a grant or reservation of mineral rights does not create a separate estate, but a prescriptible servitude, which is in the nature of an easement and can terminate for nonuse. Hence, Louisiana courts modify this rule and interpret an ambiguous instrument in a way which limits the

factor.

B. Ejusdem generis

Courts also use the constructional rule of *ejusdem generis* to clarify the word "minerals,"⁵³ but usually confine its use to ambiguous conveyances. This rule provides that specific terms in a phrase, such as "oil and gas," define and limit the general term, "minerals." *Ejusdem generis* represents a generic attempt to arrive at the intent of the parties to the conveyance. Consequently, other courts refuse to apply the rule, contending that it fails to illuminate the intent of the parties because various qualities of the specific term, such as value, use, and composition, could be employed to limit the general term.⁵⁴ The rule's application to oil shale and

rights of the servitude owner. *Whitehall Oil Co. v. Heard*, 197 So. 2d 672 (La. App. 1967), *writ ref'd*, 250 La. 924, 199 So. 2d 923 (1967). See also *McGuffy v. Weil*, 240 La. 758, 125 So. 2d 154 (1960). In contrast to private conveyances, legislative grants or reservations tend to be construed in favor of the government, as grantor. See, e.g., *Watt v. Western Nuclear, Inc.*, 462 U.S. 36 (1983); *United States v. Union Pacific R.R.*, 353 U.S. 112 (1957); *Schwarz v. State*, 703 S.W.2d 187 (Tex. 1986).

53. See, e.g., *Lazy D Grazing Ass'n v. Terry Land and Livestock Co.*, 641 F. 2d 844 (10th Cir. 1981) (reservation of "gas, casinghead gas, oil and other minerals valuable as a source of petroleum" includes only minerals which are similar in character to petroleum or which may be converted into petroleum and not necessarily all minerals serving as depositories for petroleum); *Steinman Dev. Co. v. W. M. Ritter Lumber Co.*, 290 F. 832 (W.D. Va. 1922) (grant of "all the bituminous coal, iron ore and all other minerals, and fire clay" does not include all the sand, rock, shale, water, and earth to be found on premises); *Huie Hodge Lumber Co. v. Railroads Lands Co.*, 151 La.197, 91 So. 676 (1922) (oil and gas not included is a reservation of "iron, coal, and other minerals"); *Cronkhite v. Falkenstein*, 352 P.2d 396 (Okla. 1960) (gypsum not included in reservation of "oil, gas and other minerals"); compare *Allen v. Farmers Union Coop. Royalty Co.*, 538 P.2d 204 (Okla. 1975) (*ejusdem generis* applied to determine that a reservation of "all oil, gas and mineral rights" did not convey rights to gold, silver, copper or other metallic ore); with *Panhandle Coop. Royalty Co. v. Cunningham*, 495 P.2d 108 (Okla. 1971) (copper, silver, and gold not included in a grant of "oil, gas, coal and other minerals" although *ejusdem generis* not needed to ascertain the intent of the parties as the granting clause was unambiguous). In appropriate circumstances, courts employ *ejusdem generis* to interpret legislative grants or reservations of minerals. *State Land Bd. v. State Dept. of Fish & Game*, 17 Utah 2d 237, 408 P.2d 707 (1965) (reservation to state of "coal and other minerals" did not include sand and gravel which lacked extraordinary value and were not mined in the traditional sense); cf. *Watt v. Western Nuclear, Inc.*, 462 U.S. 36 (1983) (express listing of coal in a reservation clause was not intended to limit the phrase "other minerals" given legislative history).

54. See *Luse v. Boatman*, 217 S.W. 1096 (Tex. Civ. App. 1919) where the court observed:

If we should apply the rule of *ejusdem generis*, what qualities or peculiarities of the specified type, "coal," shall be considered in determining the classification intended by the use of the word "mineral"? Are we to classify according to value? If so, can it be said that oil or gas on the one hand and coal on the other are of different kinds or species of minerals? If we classify as to use, is it not true that all three are used for fuel? Shall the classification be determined by the form, density, color, weight, value, or uses of the particular species mentioned? Taking either value, use, or nature of origin as the basis of the classification mentioned, can we say that oil and coal do not belong to the same class? It is true that coal in its commercial form is found in a solid state, while oil is a liquid. But are we justified in limiting the minerals intended to be included in the reservation to those only which are found in a solid state? Such evident difficulty in applying the rule of *ejusdem generis* to the terms of the reservation under consideration renders it an unsafe guide, and we do not

tar sands illustrates the validity of this criticism.⁵⁵ For example, should oil shale be included in a conveyance of "oil, gas, and other minerals" because it produces a substance used for fuel? Or, should it be excluded because it is not a liquid hydrocarbon, but is solid, and must be mined?

C. Parole Evidence

In order to establish the subjective intent of the parties to an ambiguous conveyance of minerals, some courts will allow the introduction of parole evidence which details facts peculiar to the transaction in question.⁵⁶ Additionally, some courts admit extrinsic evidence of the general circumstances surrounding the transaction⁵⁷ in an effort to determine the objective intent of the parties. For example, courts may use evidence that a reasonable person in the area at the time of the conveyance commonly viewed the substance as either being an integral part of the land,⁵⁸ or as being a mineral,⁵⁹ or as being incapable of commercial exploita-

believe any aid in the interpretation of the terms used in the reservation will be afforded by such rule.

Id. at 1099. See also *Southland Royalty Co. v. Pan Am. Petroleum Corp.*, 378 S.W.2d 50 (Tex. 1964), *aff'd*, 396 S.W.2d 519 (Tex. Civ. App. 1965); Reeves, *supra* note 32, at 447-449.

55. See also Note, *Minerals: Moser v. United States Steel: A New Approach to Ownership of Unspecified Minerals in Texas and Oklahoma*, 37 OKLA. L. REV. 352, 368-69 (1984) (Oklahoma should abandon the rule of *ejusdem generis* because the multitude of possible classifications to define the general character of minerals is too arbitrary to be useful).

56. See, e.g., *Kalberer v. Grassham*, 282 Ky. 430, 138 S.W.2d 940 (1940) (evidence that grantor accepted as consideration some stock in grantee's corporation engaged in the exploitation of stone admitted to establish that a sandstone rock quarry was conveyed in grant of "all the minerals . . . except coal and natural gas and coal oil"); *Monon Coal Co. v. Riggs*, 115 Ind. App. 243, 57 N.E.2d 598 (1944) (evidence that original grantee was engaged exclusively in the mining of coal admitted to establish that oil and gas were not conveyed in deed of "all the coal and fireclay and minerals"); *United States v. 1,253.14 Acres of Land*, 455 F.2d 1177 (10th Cir. 1972) (letter written by purchaser subsequent to purchase admissible to explain "all minerals" as used in a reservation). Some courts stress that resort to extrinsic evidence of such subjective intent is appropriate only when the instrument is ambiguous. *Anderson & Kerr Drilling Co. v. Bruhlmeier*, 134 Tex. 574, 136 S.W.2d 800, 127 A.L.R. 1217 (1940); *Wall v. Shell Oil Co.*, 209 Cal. App. 2d 504, 25 Cal. Rptr. 908 (1962). But cf. *New Mexico & Ariz. Land Co. v. Elkins*, 137 F. Supp. 767 (D.N.M.), *appeal dismissed*, 239 F.2d 645 (10th Cir. 1956). In *Elkins*, the district court barred the admission of extrinsic evidence to show the circumstances surrounding the deed or the intent of the parties at the time. *Id.* at 769. The court dubiously concluded that the language in the deed *unequivocally* established that uranium and thorium were included in a reservation of "all oil, gas and minerals." *Id.* at 770.

57. Thus, in interpreting a conveyance, courts may consider not only the language of the conveyance, but also the circumstances surrounding its execution. *United States ex rel. Tennessee Valley Auth. v. Harris*, 115 F.2d 343, 344 (5th Cir. 1940); *Houghton v. Thompson*, 57 Wyo. 196, 115 P.2d 654 (1941). However, if the instrument is sufficiently clear on its face, courts should refrain from such considerations. *Dawson v. Meike*, 508 P.2d 15, 18 (Wyo. 1973).

58. *Farrell v. Sayre*, 129 Colo. 368, ___, 270 P.2d 190, 192 (1954) (Reservation of "all mineral and mineral rights" does not include gravel when the entire surface of the area was nothing but sand and gravel); *Beury v. Shelton*, 151 Va. 28, 144 S.E. 629 (1928) (reservation of "all the metals and minerals" did not include limestone cropped out on almost the entire tract of land).

59. See, e.g., *Deer Lake Co. v. Michigan Land & Iron Co.*, 89 Mich. 180, 50 N.W. 807 (1891)

tion⁶⁰ in order to determine the objective intent of the parties. In contrast, other courts refuse to impute the reasonable neighbor's knowledge to the parties involved in the transaction⁶¹ because a lack of knowledge as to the existence of the substance does not necessarily preclude its conveyance.⁶² Using parole evidence to ascertain whether or not oil shale or tar sands are included in an ambiguous conveyance of minerals would produce unpredictable results dependent upon circumstances surrounding the particular transaction or the general circumstances surrounding the understanding of minerals in the community.⁶³

D. *Intrinsic Value*

Rather than concluding that a substance is a mineral if it was actually known to exist or to be capable of economic production in a given area, some courts concentrate on the intrinsic value of the substance itself. Absent an express limitation in the instrument, this analysis defines a substance as being a mineral if it has value or is special apart from the soil,⁶⁴ notwithstanding that its presence was unknown or its extraction

(marble and serpentine not included in reservation of minerals since neither was known to exist in the country and the only valuable mineral previously developed was iron); *Southern Title Ins. Co. v. Oller*, 268 Ark. 300, 595 S.W.2d 681 (1980) (limestone not a mineral as there was no evidence that chalk or limestone was generally known or regarded in the area as being a mineral); *Missouri Pac. Ry. v. Strohacker*, 202 Ark. 645, 152 S.W.2d 557 (1941) (oil and gas not included in a reservation of "all coal and mineral deposits" because oil and gas were not commonly recognized as minerals when deed executed).

60. See, e.g., *Besing v. Ohio Valley Coal Co., of Ky.*, 155 Ind. App. 527, 293 N.E.2d 510, 59 A.L.R.3d 1137 (1973) (Even though coal was known to exist in the area, it was not thought commercially recoverable, nor was there any evidence of the leasing or purchasing of coal rights in the area. Hence, coal was excluded from grant of "oil, gas and other minerals"); *Kinder v. La Salle County Carbon Coal Co.*, 310 Ill. 126, 141 N.E. 537 (1923) (limestone not included in grant of "all the rights . . . to the oil and minerals, of every description" because the grantees apparently did not interpret the deed as conveying limestone until it became valuable); *White v. Sayers*, 101 Va. 821, 45 S.E. 747 (1903) (because market for coal unavailable at time "minerals" granted, it had no commercial value and was not conveyed); *Holloway Gravel Co. v. McKowen*, 200 La. 917, 9 So. 2d 228 (1942) (gravel not included in reservation of "all the mineral, oil and gas rights" because there was no evidence the property was considered valuable for its gravel and sand).

61. *Kentucky Diamond Mining & Developing Co. v. Kentucky Transvaal Diamond Co.*, 141 Ky. 97, 132 S.W. 397 (1910) (fact that parties may not have had diamonds in mind does not affect a broad conveyance of "all the minerals"); *New Mexico & Ariz. Land Co. v. Elkins*, 137 F. Supp. 767 (D.N.M. 1956) (immaterial whether parties knew that uranium and thorium were present on land in reservation of "oil, gas and minerals" because both substances are minerals in the scientific, geological, and practical sense).

62. *Stowers v. Huntington Dev. & Gas Co.*, 72 F.2d 969, 971 (4th Cir. 1934); *Western Dev. Co. v. Nell*, 4 Utah 2d 112, 288 P.2d 452 (1955); *Barden v. Northern Pac. Ry.*, 154 U.S. 288 (1894).

63. Dependence upon such conjecture tends to stifle the development of these resources. See *Duncan*, *supra* note 9, at 39-40 (unpatented shale mining claims).

64. The West Virginia Supreme Court enunciated this "special value" rule as follows:

The term "mineral," when employed in conveyancing in this state, is understood to include every inorganic substance which can be extracted from the earth for profit, whether

unprofitable at the time of the conveyance. Using this interpretation, courts generally do not treat substances such as sand, clay, gravel, and limestone as being included in a grant or reservation of minerals, even though they could be produced commercially, because these substances possess no rare or exceptional characteristics.⁶⁵ Some courts, however, attach a caveat to this generalization and may classify such substances as minerals if they exhibit distinctive qualities,⁶⁶ contain valuable materials,⁶⁷ or are scarce in the area.⁶⁸ How might shale oil or tar sands be characterized under this special value rule and its proviso? Oil shale and tar sands certainly share many characteristics with ordinary gravel, sand, clay, and limestone which are commercially produced.⁶⁹ Moreover, because oil shale contains kerogen which must be processed, and not oil, it is arguably not special or valuable apart from the soil.⁷⁰ Alternatively, courts might view its hidden wealth as a unique attribute, and hence, classify it as a mineral.

Courts use the *ejusdem generis* rule, parole evidence, and the special value rule in an effort to ascertain how parties defined minerals in a vague conveyance. Of course, if the true intent of the parties can be gleaned from the four corners of the instrument, resort to these tools should not be necessary. Arguably, what mineral rights the parties to a lease intended to convey is easier to ascertain from the instrument itself than what mineral rights the parties to a deed intended to convey, be-

it be solid, as stone, fire clay, the various metals and coal, or liquid, as, for example, salt and other mineral waters and petroleum oil, or gaseous, unless there are words qualifying or limiting its meaning, or unless from the deed, read and construed as a whole, it appears that the intention was to give the word a more limited application.

Horse Creek Land & Mining Co. v. Midkiff, 81 W.Va. 616, ___, 95 S.E. 26, 27 (1918).

65. See, e.g., Beck v. Harvey, 196 Okla. 270, 164 P.2d 399 (1944) (gravel); Heinatz v. Allen, 147 Tex. 512, 217 S.W.2d 994 (1949) (limestone); Atwood v. Rodman, 355 S.W.2d 206 (Tex. Civ. App. 1962) (limestone), *writ ref'd*. But cf. Watt v. Western Nuclear Inc., 462 U.S. 36 (1983). In *Watt*, the court held that gravel was included in a statutory mineral reservation because it could be removed from the soil and used for commercial purposes. *Id.* at 55. However, *Watt* involved the interpretation of a reservation of minerals in a Congressional grant of homestead lands for the limited purposes of ranching and farming.

66. Hendler v. Lehigh Valley R.R., 209 Pa. 256, ___, 58 A. 486, 487 (1904), *overruled on other grounds*, Hall v. Delaware, Lackawanna & W. R.R., 270 Pa. 468, ___, 113 A. 669, 670 (1921).

67. Bambauer v. Menjoulet, 214 Cal. App. 2d 871, 29 Cal. Rptr. 874 (1963).

68. State Land Bd. v. State Dept. of Fish & Game, 17 Utah 2d 237, ___, 408 P.2d 707, 708-09 (1965) (statutory reservation).

69. Because oil shale constitutes a substantial part of the land where it is found, it might be considered an integral part of that land. See cases cited *supra* note 58.

70. Even after Congress authorized entry under the mining laws to public lands containing petroleum or other mineral oils, the status of oil shale claims remained unresolved because the claims technically did not contain oil. Andrus v. Shell Oil Co., 446 U.S. 657, 659 n.3 (1980). Perhaps tar sands might be treated less questionably given that they are sands permeated with oil. See *supra* note 26 and accompanying text.

cause a lease usually contains provisions which describe the development of the minerals granted.⁷¹ Often, however, the instrument itself is ambiguous and courts must speculate as to what unnamed minerals the parties intended to convey in addition to the named minerals.⁷² There are three other ways courts may analyze an ambiguous instrument in an attempt to ascertain the intentions of the parties to a conveyance.

E. *Specific/General Intent*

The specific/general intent test provides that when a grant or reservation is made of all minerals without qualifying language, it should be assumed that the parties generally intended to sever the entire mineral estate from the surface estate. Furthermore:

[T]he severance should be construed to sever from the surface all substances presently valuable in themselves, apart from [sic] the soil, whether their presence is known or not, and all substances which become valuable through development of the arts and sciences, and that nothing presently or prospectively valuable as extracted substances would be intended to be excluded from the mineral estate.⁷³

Two limitations qualify this presumption. First, it is not applicable to conveyances which exhibit a specific intent.⁷⁴ Second, some form of

71. See generally Lopez, *supra* note 33, at 999. In *Praetorian Diamond Oil Ass'n v. Garvey*, 15 S.W.2d 698 (Tex. Civ. App. 1929), a Texas court considered a lease conveying "all oil, gas, and other minerals." The lease further granted the right to erect derricks, build tanks, and lay pipe lines. The court concluded that the parties did not intend to lease rights to gravel since the lease's provisions addressed methods of oil and gas production, and made no provision for the mining of gravel. *Id.* at 700. See also *Wulf v. Shultz*, 211 Kan. 724, 508 P.2d 896 (1973) (intention of the parties to a lease which conveyed rights to "dig, drill, operate for and procure natural gas, petroleum and other mineral substances" was to restrict its scope to the exploration and production of oil, gas, and related minerals, and not to grant rights to coal, clay, gypsum, or limestone). Sometimes, the royalty clause in a lease helps to explain what substances are to be included in the term "other minerals." Reeves, *supra* note 32 at 452-53.

72. Perhaps courts should distinguish leases from deeds, and refrain from applying general rules of interpretation to leases which obviously contemplate the development of certain minerals, and assume instead that the parties intended to limit the grant to the minerals capable of being developed by those methods. See Clark, *Uranium Problems*, 18 TEX. BAR J. 505, 537-38 (1955); Note, *Beneath the Surface-Destruction Test: The Dialectic of Intention and Policy*, 56 TEX. L. REV. 99 (1977).

73. Kuntz, *The Law Relating to Oil and Gas in Wyoming*, 3 WYO. L.J. 107, 113 (1949). See also *Amoco Prod. Co. v. Guild Trust*, 461 F. Supp. 279 (1978), *aff'd*, 636 F.2d 261, *cert. denied*, *Guild Trust v. Amoco Prod. Co.*, 452 U.S. 967 (1981); *Acker v. Guinn*, 464 S.W.2d 348 (Tex. 1971). This test differs from the use of parole evidence to determine either the subjective or objective intent because it presumes a general intent instead of trying to ascertain an unexpressed specific intent. See *supra* notes 56-62 and accompanying text.

74. Kuntz, *supra* note 73, at 114. Some courts have gleaned a specific intention of the parties to limit the conveyance and have excluded other substances. See, e.g., *Rock House Fork Land Co. v. Raleigh Brick & Tile Co.*, 83 W. Va. 20, 97 S.E. 684 (1918) (clay excluded in reservation which contemplated the mining of coal); *Kinder v. La Salle County Carbon Coal Co.*, 310 Ill. 126, 141 N.E. 537 (1923) (gravel excluded from grant which contemplated underground mining operations);

compensation must be paid to the surface owner for those substances which cannot be removed without unreasonable injury to the enjoyment of the surface.⁷⁵

With respect to oil shale and tar sands, a key attribute of this definition of minerals is that it includes substances "which become valuable through development of the arts and sciences."⁷⁶ Indeed, the commercial development of western shale is recent, and the potential development of eastern shale is still being explored. It appears this test would include shale in the mineral estate, although compensation might be due the surface owner because its development arguably causes unreasonable injury to the enjoyment of the surface.⁷⁷ The Supreme Court recognized the prospective value of oil shale in *Andrus v. Shell Oil Co.*⁷⁸ In that case, the Court determined that oil shale claims made before the Mineral Leasing Act of 1920,⁷⁹ which withdrew oil shale from discovery under the general mining laws, were valid even though shale at the time of the claims had no present marketability.⁸⁰ The Court reviewed the legislative history of the Act and concluded that Congress did not consider present marketability to be a prerequisite to the patentability of oil shale.⁸¹ *Andrus*, of course, involved statutory interpretation. However, a

Fisher v. Keweenaw Land Ass'n, 371 Mich. 575, 124 N.W.2d 784 (1963) (gravel and sand not included in reservation which contemplated the mining of metallic ores or metal bearing minerals). The court in *Besing v. Ohio Valley Coal Co.*, of Ky., 155 Ind. App. 527, 293 N.E.2d 510, 59 A.L.R.3d 1137 (1973) recognized the specific/general intent test but apparently applied it incorrectly. That court concluded that the only general intent of the parties was to transfer an interest in oil and gas, and not to sever the entire mineral estate. *Id.* at 514. The court further concluded that because there was no specific intent to convey coal, it was not included in the term "other minerals." *Id.* at 513. Applying the specific/general intent test, however, would lead to the conclusion that coal was included in the severance absent a specific limitation of the conveyance of oil and gas. The instrument need not exhibit a general intent to sever the mineral state. That intent is presumed absent a contrary specific intent.

75. Kuntz, *supra* note 73, at 113, 115.

76. *Id.* at 113. Cf. *McKinney's Heirs v. Central Ky. Natural Gas Co.*, 134 Ky. 239, 120 S.W. 314 (1909) (natural gas and rights associated with its development not mentioned in deed of minerals, therefore general intent of the parties was not to convey gas). See also *infra* notes 132-40 and accompanying text.

77. See *infra* notes 115-26 and accompanying text.

78. 446 U.S. 657 (1980).

79. 30 U.S.C. §§ 181-193 (1982).

80. For a discussion of this case and its history, see Comment, *Andrus v. Shell Oil Co.: The Marketability Standard and the Oil Shale Exception*, 58 DEN. L.J. 453 (1981); Duncan, *supra* note 9; Israel, *supra* note 11. See also Reidy, *Do Unpatented Oil Shale Mining Claims Exist?*, 43 DEN. L.J. 9 (1966) (historical analysis and discussion of the positions of the government and the mining claimants before *Andrus* decision).

81. *Andrus v. Shell Oil Co.*, 446 U.S. 657, 663 (1980). The present marketability standard requires, for the issuance of a patent, that minerals "can be 'extracted, removed and marketed at a profit.'" *United States v. Coleman*, 390 U.S. 599, 600 (1968). The *Andrus* decision has been criticized on several grounds. See, e.g., Comment, *supra* note 80, at 462-63 (validation of claims will not

federal court examined this decision in *Lazy D Grazing Association v. Terry Land and Livestock Co.*⁸² and concluded that private parties intended to reserve coal in a reservation of "all gas, casinghead gas, oil and other minerals valuable as a source of petroleum."⁸³ The court affirmed the trial judge's finding that the conveyance embraced minerals which had prospective value at the date of the severance, such as coal and oil shale.⁸⁴ Although neither decision is directly on point, both support the contention that oil shale and tar sands could have sufficient prospective value to fall within the severed mineral estate if a court applies the specific/general test.⁸⁵

F. *Surface Destruction*

The caveat to the specific/general intent test which addresses the method of extracting the mineral in relation to the surface influences a court's interpretation of the word minerals under another analysis, the "surface destruction" test. Under this test, courts deduce that a broad grant or reservation of a mineral interest does not include a substance which can only be extracted by destroying the surface, reasoning that interpreting the term otherwise would leave the surface owner with nothing.⁸⁶ Thus, this analysis generally presumes that parties to a severance of estates would not intend for the surface estate to be destroyed, for example, by strip mining.⁸⁷

promote government policy of development); Duncan, *supra* note 9, at 1 (decision fails to resolve uncertainties of title); Andrus v. Shell Oil Co., 446 U.S. 657, 674 (Stewart, J., dissenting) (no evidence government intended to exclude oil shale claims from present marketability standard).

82. 641 F.2d 844 (10th Cir. 1981).

83. *Id.* at 845.

84. *Id.* at 845-46. Moreover, the appellate court noted that coal, at the time of the dispute, was not valuable because it was not competitive with other sources of energy, but resolved that under certain circumstances it could become valuable. *Id.* at 847.

85. Indeed, it is difficult to imagine a substance which would not fall within the mineral estate because disputes as to ownership arise only after the value of a substance's extraction is discovered.

86. See generally *Heinatz v. Allen*, 147 Tex. 512, 217 S.W.2d 994 (1949) (reservation of "the mineral rights" did not include limestone, removal of which would result in the virtual destruction of the surface); *Atwood v. Rodman*, 355 S.W.2d 206 (Tex. Civ. App. 1962) (limestone not included in grant of "oil, gas and other minerals" because its removal by open pit or quarrying methods would render the surface useless for ranching or farming), *writ ref'd*; *Christensen v. Chromalloy Am. Corp.*, 99 Nev. 34, 656 P.2d 844 (1983) (preliminary injunction issued to enjoin removal of barite which could belong to the surface estate because its extraction would consume, deplete, or destroy the surface estate).

87. Some courts scrutinize this general intent more closely to examine whether the parties specifically contemplated deep mining as opposed to strip mining. See, e.g., *Skivolocki v. East Ohio Gas Co.*, 38 Ohio St. 2d 244, 313 N.E.2d 374 (1974) (language of deed particularly applicable to deep mining, and technique of strip mining unknown when conveyance of "all coal" made); *Stewart v. Chernicky*, 439 Pa. 43, 266 A.2d 259 (1970) (provisions in grant of "all coal" referred to ventilation, a feature of deep mining, and no evidence that strip mining being conducted in area at time of grant);

Texas courts refined and grappled with this rule perhaps more than any other state's courts.⁸⁸ In *Acker v. Guinn*,⁸⁹ the Texas Supreme Court ruled as a matter of law that "[u]nless the contrary intention is affirmatively and fairly expressed . . . a grant or reservation of 'minerals' or 'mineral rights' should not be construed to include a substance that must be removed by methods that will, in effect, consume or deplete the surface estate."⁹⁰ Subsequently, the court in *Reed v. Wylie*⁹¹ refined the test and held that if *at the date of the grant or reservation*, the substance near the surface *only* could have been extracted by a method which would have destroyed the surface, then it belonged to the surface owner.⁹² Upon reconsideration, the court in *Reed v. Wylie (II)*⁹³ further tailored the test, and held that a deposit within two hundred feet of the surface would be considered near the surface as a matter of law.⁹⁴ The court also changed the inquiry regarding the method of removal to whether any

Doochin v. Rackley, 610 S.W.2d 715 (Tenn. 1981) (because strip mining for coal in region not used at time of reservation of "all oil, gas, saline and mineral substances" made, strip mining could not have been within the contemplation of the parties); West Virginia-Pittsburgh Coal Co. v. Strong, 129 W. Va. 832, 42 S.E.2d 46 (1947) (broad form deed of mining rights which referred to rights to dig and to excavate did not include right to strip mine); White v. Miller, 200 N.Y. 29, 92 N.E. 1065 (1910) (limestone which could only be removed by quarrying not included in a reservation of "mines and minerals" which referred to the business of mining and removing ores and minerals. *But cf.* Northern Pac. Ry. v. Soderberg, 188 U.S. 526 (1903) (definition of minerals not aided by distinguishing substances which are mined from those which are quarried); Lazy D Grazing Ass'n v. Terry Land & Livestock Co., 641 F.2d 844 (10th Cir. 1981) (no evidence that strip mining of coal would result in substantial destruction of surface); Christman v. Emineth, 212 N.W. 2d 543, 70 A.L.R.3d 366 (N.D. 1973) (strip mining of lignite not destructive of surface because state law required reclamation). Other courts have looked to the nature of the mineral conveyed and the common means of extracting such mineral to determine the parties' intent. Commonwealth v. Fitzmartin, 376 Pa. 390, 102 A.2d 893 (1954) (to permit strip mining was the more rational interpretation of "all the coal . . . in . . . the surface of said land" since the coal on the surface could not be removed by deep mining). Oftentimes, courts will use the surface destruction test in conjunction with other interpretive tools in an effort to define minerals. *See, e.g.*, Witherspoon v. Campbell, 219 Miss. 640, 69 So. 2d 384 (1954) (construction against attorney-grantor and extrinsic evidence to establish objective intent); Heinatz v. Allen, 147 Tex. 512, 217 S.W.2d 994 (1949) (special value); Christensen v. Chromalloy Am. Corp., 99 Nev. 34, 656 P.2d 844 (1983) (parole evidence).

88. For a discussion of the significant Texas cases, see generally Note, *Abandonment of the Surface Destruction Test in Determining the Ownership of Unnamed Minerals: Moser v. United States Steel Corp.*, 15 TEX. TECH L. REV. 699 (1984); Comment, *Lignite: Surface or Mineral — The Surface Destruction Test and More*, 29 BAYLOR L. REV. 879 (1977); Note, *Ownership of Lignite Under a General Reservation of Mineral Rights: Acker v. Guinn Applied*, 15 HOUS. L. REV. 187 (1977); Note, *Mines and Minerals—Mineral Reservation*, 9 ST. MARY'S L.J. 624 (1978); Note, *supra* note 55, at 358-69. Note, *supra* note 72.

89. 464 S.W.2d 348 (Tex. 1971).

90. *Id.* at 352.

91. 554 S.W.2d 169 (Tex. 1977), *overruled*, Reed v. Wylie (II), 597 S.W.2d 743 (Tex. 1980).

92. *Id.* at 172. Furthermore, if any part of the substance met this criterion, then all of the substance, at whatever depth it occurred, belonged to the surface estate. *Id.*

93. 597 S.W.2d 743 (Tex. 1980).

94. *Id.* at 748.

reasonable method of extraction, at the time of the opinion, would have destroyed the surface.⁹⁵ If the surface-destructive method is reasonable, the mineral is to be included in the surface estate.

The production of oil shale and tar sands would probably be considered surface destructive if produced through surface mining.⁹⁶ If they were produced by the room and pillar method of mining, then maybe not.⁹⁷ However, the disposal of spent shale on site may be deemed surface destructive.⁹⁸ On the other hand, in situ processes⁹⁹ are not necessarily surface destructive,¹⁰⁰ although some minor interference with the surface estate may occur. Of course, if a court followed the *Reed* refinements of *Acker*, the ownership of shale might depend upon such fortuitous conditions as its metered distance to the surface and the state of the art of mineral development when litigation commences.

G. Ordinary and Natural Meaning of the Word "Mineral"

Finally, some courts define minerals in ambiguous grants or reservations as all substances within the ordinary and natural meaning of the word.¹⁰¹ The precise legal meaning of this phrase is elusive,¹⁰² except

95. *Id.* at 747. A rigid application of the surface destruction test leads to an anomalous result. The *Acker* and *Reed* courts acknowledged that the substances in question, ore and lignite, were minerals, *Acker v. Guinn*, 464 S.W.2d 348, 351 (Tex. 1971); *Reed v. Wylie*, 554 S.W.2d 169, 172 (Tex. 1977), but denied the mineral owner the right to develop them. In other words, the mineral owner owns minerals. Iron ore and lignite are minerals, but the mineral owner possesses no right to enjoy them. Is the surface estate then expanded to include some minerals? Or are these minerals "undevelopable"?

96. *See supra* notes 16-17 and accompanying text. The surface mining of shale, like limestone and coal, requires the removal of the overburden which tends to destroy the surface. *See generally* Nevill, *Multiple Uses and Conflicting Rights*, 13 ST. MARY'S L.J. 783, 784-85 (1982); *Heinatz v. Allen*, 147 Tex. 512, 217 S.W.2d 994, 996 (1949). The mining of shale close to the surface through open pits has been found to be surface destructive. *Bibby v. Bunch*, 176 Ala. 585, 58 So. 916 (1912). *See also* *Carson v. Missouri Pac. R.R.*, 212 Ark. 963, 209 S.W.2d 97 (1948) (the extraction of alumina from bauxite, a clay formation which is mined by the digging of open pits, is surface destructive); *Storm Assocs. v. Texaco, Inc.*, 645 S.W.2d 579 (Tex. Ct. App. 1982), *aff'd*, *Friedman v. Texaco, Inc.*, 691 S.W.2d 586 (Tex. 1985) (evidence sufficient to support a jury finding that strip mining of uranium was a reasonable means of extraction and would deplete the surface).

97. *See supra* note 18 and accompanying text.

98. *See supra* note 24 and accompanying text.

99. *See supra* notes 21-22 and accompanying text.

100. *See Moser v. United States Steel Corp.*, 601 S.W.2d 731, 734 (Tex.Civ. App. 1980) (only reasonable method of mining uranium at the time of trial was by in situ leaching, a process that did not result in substantial destruction of the surface), *aff'd on other grounds*, 676 S.W.2d 99 (Tex. 1984).

101. *See, e.g.*, *Rudd v. Hayden*, 265 Ky. 495, 97 S.W.2d 35 (1936); *Elkhorn City Land Co. v. Elkhorn City*, 459 S.W.2d 762 (Ky. 1970); *Little v. Carter*, 408 S.W.2d 207 (Ky. 1966). Some courts use this test in conjunction with another analysis. *See, e.g.*, *Atwood v. Rodman*, 355 S.W.2d 206 (Tex. Civ. App. 1962) (special value); *Heinatz v. Allen*, 147 Tex. 512, 217 S.W.2d 994 (1949) (special value and surface destruction), *aff'g Allen v. Heinatz*, 212 S.W.2d 987 (Tex. Civ. App. 1948); *Holland v. Dolese Co.*, 540 P.2d 549 (Okla. 1975) (special value).

that it rejects a scientific or technical definition.¹⁰³

Texas recently adopted this approach in *Moser v. United States Steel Corp.*¹⁰⁴ with some qualifications.¹⁰⁵ In doing so, the court held that some substances such as limestone, caliche, surface shale, sand, and gravel would be excluded from this definition of minerals as a matter of law.¹⁰⁶ The court also retained the surface destruction test of the *Acker-Reed* trilogy for iron ore and near surface lignite.¹⁰⁷ Thus, under Texas law, it seems that there is nothing ordinary or natural about the meaning of minerals.¹⁰⁸ "Common substances" are excluded from ambiguous grants or reservations of minerals possibly along with iron ore and coal, while uranium might be included within those conveyances, depending upon what judicial pronouncement was in effect at the time the deed or

102. Science divides all matter into three kingdoms: animal, plant, and minerals. The ordinary and natural meaning of minerals, however, must exclude more substances than this broad, scientific classification would embrace, or a grant or reservation of "minerals" would include even the soil itself. *Psencik v. Wessels*, 205 S.W.2d 658, 659 (Tex. Civ. App. 1947). One author suggests that the meaning may be established by looking to the substance's chemical composition and the meaning of minerals as used in the mining industry, the commercial world, and by landowners. Note, *supra* note 55, at 363-64. If the ordinary and natural meaning concentrates on the substance's value apart from the soil, then this analysis would approximate that of the special value test. See *supra* text accompanying notes 64-68. If this definition were not limited to the ordinary meaning of the word minerals at the time of the grant or reservation, then this analysis would approximate the specific/general intent analysis. See *supra* text accompanying notes 73-75.

103. *Heinatz v. Allen*, 147 Tex. 512, 217 S.W.2d 994, 997 (1949).

104. 676 S.W.2d 99, 102 (Tex. 1984) (uranium is a mineral within the ordinary and natural meaning of the term). See generally Note, *Moser v. United States Steel Corp.: Owners of "Other Minerals" Hit Pay Dirt as Texas Buries Acker-Reed Surface Destruction Test*, 5 J. ENERGY L. & POL'Y 147 (1983); Note, *supra* note 55. This case represents a return to earlier cases which expounded the ordinary and natural meaning definition of minerals. *Heinatz v. Allen*, 147 Tex. 512, 217 S.W.2d 994 (1949); *Atwood v. Rodman*, 355 S.W.2d 206 (Tex. Civ. App. 1962).

105. If the removal of a substance defined as a mineral under the ordinary and natural meaning test would interfere unreasonably with surface use, some compensation may be required. See *infra* notes 115-19 and accompanying text.

106. *Moser v. United States Steel Corp.*, 676 S.W.2d 99, 102 (Tex. 1984). The decision essentially reflects the opinion of the dissent in *Reed v. Wylie*, 554 S.W.2d 169, 174 (Tex. 1977) (Daniel, J., dissenting).

107. *Id.* An earlier decision, *Moser v. United States Steel Corp.*, 26 Tex. SUP. CT. J. 427 (1983), which was withdrawn, did not exclude these substances expressly. In fact, in the time between the earlier decision and the final *Moser* pronouncement, an appellate court found coal and lignite to be minerals within the ordinary and natural meaning of the term. *Schwarz v. State*, 658 S.W.2d 822, 823 (Tex. Civ. App. 1983), *aff'd*, 703 S.W.2d 187 (Tex. 1986). *Schwarz* involved a state claim to coal under a reservation in a land grant. The Texas Supreme Court affirmed the appellate court's decision after the final *Moser* decision, not on the grounds that coal was a mineral within the ordinary and natural meaning of the word, but on the grounds that legislative grants must be strictly construed in favor of the state. Hence, coal and lignite were reserved to the state regardless of whether the recovery of these substances would destroy or deplete the surface estate. *Schwarz v. State*, 703 S.W.2d 187, 189 (Tex. 1986).

108. Accord Brooks, *What To Do About Those Pesky Mineral Interests: The Dominant Mineral Estate From the Surface Developer's Point of View*, 48 TEX. BAR J. 1262, 1264 (1985) (Part 2) [hereinafter cited as Brooks II].

lease was executed.¹⁰⁹

How oil shale or tar sands would be classified according to the ordinary and natural meaning of the word minerals is difficult to predict. If the attributes they share with such common substances as limestone, sand, or gravel were emphasized, they probably would not be classified as minerals.¹¹⁰ Additionally, courts often augment this general inquiry with another analysis, such as the surface destruction, special value, or specific/general intent tests,¹¹¹ which serves to further confuse the issue.

In sum, courts use a variety of interpretative tools in an attempt to establish the intent of the parties to an ambiguous grant or reservation of minerals. This array of judicial principles yields no logically consistent result regarding how a given substance such as oil shale will be defined. Hence, the ownership of certain substances remains in dispute. Yet, the issue of who owns the rights to develop a substance does not terminate with the classification of the substance.

V. THE RESPECTIVE RIGHTS AND DUTIES OF THE MINERAL AND SURFACE OWNERS

Generally, the mineral estate is considered to be the dominant estate, and the surface estate the servient estate.¹¹² As a result, the mineral owner enjoys an implied easement over the surface in order to exploit the mineral rights free from interference by the surface owner.¹¹³ This implied easement is limited to that use which is reasonably necessary to

109. The *Moser* decision is only applicable to severances made after June 8, 1983. *Moser v. United States Steel Corp.*, 676 S.W.2d 99, 103 (Tex. 1984). In a case decided subsequent to *Moser*, the court held that the same substance in question, uranium, belonged to the landowner under the law in effect at the time, because its extraction would consume, deplete, or destroy the surface of the land. *Friedman v. Texaco, Inc.*, 691 S.W. 2d 586 (Tex. 1985), *aff'g* *Storm Ass'n, Inc. v. Texaco, Inc.*, 645 S.W.2d 579 (Tex. Civ. App. 1984). Thus, as the dissenting judge in *Friedman* intimated, a great deal of title uncertainty remains with respect to minerals. *Friedman*, 645 S.W.2d at 589 (Ray, J., dissenting).

110. See *supra* notes 37-43 and accompanying text.

111. In addition to recognizing traces of the special value and surface destruction tests, the Texas Supreme Court in *Moser* purported to adopt the specific/general intent test. *Moser v. United States Steel Corp.*, 676 S.W.2d 99, 102 (Tex. 1984). Given the practical confusion as to the status of minerals in Texas, however, it is difficult to ascertain how this analysis contributes to the definition.

112. See generally Brooks, *What To Do About Those Pesky Mineral Interests: The Dominant Mineral Estate From the Surface Developer's Point of View*, 48 TEX. BAR J. 1138 (1985) (Part 1) [hereinafter cited as Brooks I]; Lopez, *supra* note 33, at 1003-14. But cf. *Bibby v. Bunch*, 176 Ala. 585, ___, 58 So. 916, 917 (1912) (right to mine shale, a mineral, is servient to the right of the owner of the surface to have it perpetually sustained in its natural state).

113. Concomitantly, the surface owner enjoys the right to subjacent support. See generally, Note, *The Common Law Rights to Subjacent Support And Surface Preservation*, 38 MO. L. REV. 234 (1973).

enjoy the rights incidental to mineral ownership.¹¹⁴ Exceeding the boundaries of reasonable use through excessive use, negligence, or willful misconduct may give rise to a cause of action by the surface owner for damages.¹¹⁵ Furthermore, Texas, in the previously discussed *Moser* case,¹¹⁶ extended the mineral owner's liability for damages to non-negligent, non-excessive uses, causing surface destruction when the substance exploited was an unnamed mineral in a general grant or reservation of "other minerals."¹¹⁷ This notion of expanded liability derives from what is known as the "accommodation," or "due regard," doctrine which is recognized in some jurisdictions.¹¹⁸ That doctrine somewhat diminishes the dominance of the mineral estate, and requires the mineral owner to choose a less onerous method of development than the one preferred, one which interferes less with the enjoyment of the surface, if such a method is reasonably available.¹¹⁹

114. See generally Nevill, *supra* note 96. See also *Wall v. Shell Oil Co.*, 209 Cal. App. 2d 504, 25 Cal. Rptr. 908 (1962); *Harris v. Currie*, 142 Tex. 93, 176 S.W.2d 302 (1943), *aff'g* *Currie v. Harris*, 172 S.W.2d 404 (Tex. Civ. App. 1943); *Ball v. Dillard*, 602 S.W.2d 521 (Tex. 1980); *Humble Oil & Refining Co. v. Williams*, 420 S.W.2d 133 (Tex. 1967). The civil law of Louisiana does not recognize servient and dominant estates *per se*. Rather, the law addresses the notion of reasonable use as the correlative rights and obligations of the landowner and the servitude (mineral) owner. See generally *Delahoussaye v. Landry*, 3 La. Ann. 549 (La. 1848). Some courts seem to blur the distinction between ownership and the reasonable use of owned rights, and require an affirmative showing of a grant to strip mine, arguably an unreasonable use of the surface. See, e.g., *Stewart v. Chenicky*, 439 Pa. 43, 266 A.2d 259 (1970); *Skivolocki v. East Ohio Gas Co.*, 38 Ohio St. 2d 244, 313 N.E.2d 374 (1974); *Martin v. Kentucky Oak Mining Co.*, 429 S.W.2d 395 (Ky. 1968).

115. An unreasonable use could involve damages to improvements, standing timber, or growing crops. See *Brooks I*, *supra* note 112, at 1141. However, exactly what conduct would give rise to an action for damages remains uncertain. In reality, the mineral owner or his lessee would be advised to settle this issue in advance with surface owner. See generally *Brooks II*, *supra* note 108, at 1264-66; Nevill, *supra* note 96, at 799; Day, *Relative Rights of the Surface Owner and the Owner or Lessee of the Mineral Estate*, 30 LANDMAN 41, 45 (Oct. 1985). Additionally, absent a statutory or contractual provision, there generally is no obligation on the part of the mineral owner to restore the surface. But see *Smith v. Schuster*, 66 So.2d 430 (La. App. 1953) (mineral lessee must restore the surface even though the lease contract is silent).

116. *Moser v. United States Steel Corp.*, 676 S.W.2d 99 (Tex. 1984). See also *supra* notes 104-109 and accompanying text.

117. *Moser v. United States Steel Corp.*, 676 S.W.2d 99, 103 (Tex. 1984). The court retained the limitation on liability to negligently inflicted damage to, or excessive use of, the surface estate when the substance exploited was conveyed expressly. *Id.* It justified this difference in treatment by noting that:

It is reasonable to assume a grantor who expressly conveys a mineral which may or must be removed by destroying a portion of the surface estate anticipates his surface estate will be diminished when the mineral is removed. It is also probable the grantor has calculated the value of the diminution of his surface in the compensation received for the conveyance. This reasoning is not compelling when a grantor conveys a mineral which may destroy the surface in a conveyance of "other minerals."

Id.

118. See generally *Brooks I*, *supra* note 112, at 1138; *Lopez*, *supra* note 33, at 1007-10; Nevill, *supra* note 96, at 787.

119. See, e.g., *Getty Oil Co. v. Jones*, 470 S.W.2d 618 (Tex. 1971) (mineral lessee required to use

Such restrictions could constrain the development of oil shale and tar sands even if courts classified these substances as minerals.¹²⁰ The production of shale requires large amounts of water and the completed retorting process yields contaminated waste water.¹²¹ Disputes may arise over the rights to this water,¹²² generally not classified as a mineral,¹²³ as well as over the method of its disposal after use.¹²⁴ Additionally, questions may arise regarding the reasonable disposal of the significant volume of solid waste produced from shale mining activities, as well as over the obligation of the mineral owner, if one exists, to restore the surface by revegetation.¹²⁵

Arguably, inherent in the various analyses courts employ to classify substances as minerals are policy considerations guised as attempts to ascertain the intent of the parties to a severance of the mineral estate. Certainly, the recognition of the respective rights and duties of the owners of severed estates in the enjoyment of the interest owned demonstrates that ownership is not equated absolutely with the right to develop. Competing uses must be accommodated. Whether the present jurisprudence adequately achieves this accommodation in an equitable, efficient, and predictable manner is a matter of debate.

reasonable, though more costly, alternative to reciprocating pumps, which interfered with surface owner's irrigation system); *Flying Diamond Corp. v. Rust*, 551 P.2d 509 (Utah 1976) (damages awarded to surface owner for injury to crops when reasonable alternative existed for location of access road); *Hunt Oil Co. v. Kerbaugh*, 283 N.W.2d 131 (N.D. 1979) (surface owner must be permitted to show reasonable alternative existed for mineral owner's seismic exploration). The key inquiry is whether reasonable alternatives exist, not whether any other alternative exists. *See Sun Oil Co. v. Whitacker*, 483 S.W.2d 808 (Tex. 1972) (lessee's implied right included the right to use as much water from surface owner's underground water as reasonably necessary for secondary recovery operations).

120. Much of eastern shale is located in populated areas or land used for farming. *See Survey*, *supra* note 7, at 15.

121. *See generally McCloskey*, *supra* note 24, at 4; *GUIDE*, *supra* note 16, at 17; *CHEMICAL TECHNOLOGY*, *supra* note 6, at 350.

122. For a discussion of rules governing the ownership, prior appropriation, and dewatering of ground water, see *Lopez*, *supra* note 33, at 1025-27. *See also Sun Oil Co. v. Whitacker*, 483 S.W.2d 808 (Tex. 1972) (accommodation doctrine and use of water).

123. *See supra* note 48 and accompanying text.

124. For a discussion of the disposal of waste or salt water produced by drilling, see *Ellis v. Arkansas La. Gas Co.*, 450 F. Supp. 412 (E.D. Okla. 1978), *aff'd*, 609 F.2d 436 (10th Cir. 1979), *cert. denied*, 445 U.S. 964 (1980); *Sunray Oil Co. v. Cortez Oil Co.*, 188 Okla. 690, 112 P.2d 792 (1941).

125. *See supra* note 24 and accompanying text. *See also CHEMICAL TECHNOLOGY*, *supra* note 6, at 351; *GUIDE*, *supra* note 16, at 14-15. Revegetation can be difficult and costly because it requires mulching, fertilization, and irrigating, along with increasing the amount of top soil. *Id.* at 15.

VI. A PROPOSAL FOR BALANCING THE RIGHTS OF PARTIES TO AN UNNAMED SUBSTANCE IN A GENERAL GRANT OR RESERVATION OF MINERALS

As part IV of this article has revealed, courts have struggled in vain to fairly, consistently, and adequately define the rights and responsibilities of the surface estate and mineral estate owners when the estate has been severed and development of new "minerals" is sought.¹²⁶ When courts render that ultimate decision, many times the enriched party stands in a remote relationship to the parties to the original severance. Of course, purchasers for value should be able to rely on the validity of their titles. But in reality, does our present jurisprudence provide any assurance as to what actually is owned? Should the legal system, in retrospect, speculate upon the unspecified intent of the parties to a severance, perhaps far removed from the litigants, in order to vest ownership rights in that litigant who owns the appropriate estate?¹²⁷

Indeed, the classification of rights to unnamed substances as being a part of the mineral or surface estate suggests that there is some geographically delineated subsurface boundary. This analysis blurs the real issue, which is determining the relative rights of the parties to enjoy the land, without any mystical demarcations.¹²⁸ Courts have recognized correlative rights to enjoyment by imposing an easement over the surface in favor of the mineral estate, limited to reasonable use.¹²⁹ However, this corollary is logically inconsistent with the premise of absolute ownership of estates. If one owns a substance as part of a dominant estate, why must compensation be paid to possess it? Moreover, recognizing this bifurcated interest of an estate coupled with an easement seems to ignore the fact that an easement is capable of being abandoned, even though a corporeal mineral estate cannot be abandoned by its owner.¹³⁰ If this easement of reasonable use originated at the severance of the estates, an

126. See *supra* notes 50-111 and accompanying text.

127. One court observed: "It is equally plain that it would be destructive of the security of deeds if the rights of purchasers for value should be made to depend on the intention in the mind of remote vendors that was not expressed in the conveyance, and of which intention they had no actual notice." *Hudson v. McGuire*, 188 Ky. 712, —, 223 S.W. 1101, 1105, 17 A.L.R. 148, 155, (Ky. Ct. App. 1920). This criticism may not be applicable to leases. See *supra* notes 71-72 and accompanying text.

128. Harrell, *Developments in Nonregulatory Oil & Gas Law*, 30 INST. ON OIL & GAS L. & TAX'N, 311, 321-25 (1979).

129. See *supra* notes 112-119 and accompanying text.

130. For a discussion of the abandonment of mineral interests, see generally 1 WILLIAMS & MEYERS, OIL AND GAS LAW § 210.1 (1985). California, a non-ownership in place jurisdiction, classifies mineral interests as incorporeal hereditaments which are capable of being abandoned. See *Gerhard v. Stephens*, 68 Cal. 2d 864, 882-83, 442 P.2d 692, 707-08, 69 Cal. Rptr. 612, 627-28 (1968).

argument could be made that it could subsequently be terminated for non-use. Yet, courts have not examined this possibility.¹³¹

Rather, the issue has revolved around defining the contents of the estate and trying to ascertain the unspecified intent of the parties. Courts have defined this general intent in two basic ways. First, they have defined it as an intent to sever all substances of value.¹³² In the instance of an owner selling a prosperous dairy farm while reserving "the minerals," the question arises as to whether the general intent of the parties to that transaction is to sell the land for its surface use, or to retain the hope that minerals will be discovered in the future. In such a situation, the parties most likely intended to deal with the value of the surface, and not with the value of speculative mineral developments.¹³³

While some courts have considered the value of the surface for agricultural or grazing purposes, other courts apparently have overlooked this factor in establishing the general intent of the parties.¹³⁴ In the previously discussed *Watt* case,¹³⁵ the Supreme Court specifically addressed the issue of congressional intent in severing the minerals from a grant of homestead rights. Resolving that the decision as to whether a particular substance was included in the surface estate or the mineral estate should be made in light of the use of the surface which Congress contemplated,¹³⁶ the Court concluded that "[s]ince Congress could not have ex-

131. Assume that the argument proves successful and a court holds that an easement incidental to a mineral estate severed over one hundred years previously was abandoned. Consequently, oil shale could not be produced by the mineral owner. Does not this extinction of the right suggest that the original parties overlooked the issue of oil shale ownership nor assign the right to produce it, intentionally or unintentionally?

132. See *supra* notes 64-68, 73-75 and accompanying text.

133. See Harrell, *Recent Developments in Nonregulatory Oil and Gas Law*, 31 INST. ON OIL & GAS L. & TAX'N. 327, 360-61 (1980). In arguing that lignite was not included in a general reservation of minerals, one surface owner postulated that:

TO SUGGEST, . . . THAT 93,000 ACRES OF WOODLANDS, BOUGHT FOR THE EXPRESS PURPOSE OF SUPPLYING A PAPER MILL, COULD AT ANY TIME AND FROM TIME TO TIME IN THE INDEFINITE FUTURE, BE STRIPPED OF THE TREES AT THE WHIM OF A MINERAL OWNER FOR WHATEVER SOLID MINERAL OR OTHER SUBSTANCE IT MIGHT PROVE DESIRABLE TO MINE, WOULD HAVE BEEN TOTALLY BEYOND THE COMPREHENSION, INTENT AND KNOWLEDGE OF THE PARTIES.

Continental Group, Inc. v. Allison, 379 So. 2d 1117, 1124 (La. App. 1979) (emphasis in original), *rev'd*, 404 So.2d 428 (La. 1981), *cert. denied*, 456 U.S. 906 (1982).

134. Compare *Acker v. Guinn*, 464 S.W. 2d 348 (Tex. 1971) (consideration of surface value of land) with *Reed v. Wylie*, 554 S.W. 2d 169 (Tex. 1977) (no examination of surface value). If it is desirable to ascertain the true intent of the parties with respect to unspecified minerals, the surface use at the time of the severance should be a factor to consider. One author advocates retaining any disputed substance in the surface estate, because to do so deprives the mineral owner of nothing for which he actually bargained. Note, *supra* note 72, at 111, 118.

135. *Watt v. Western Nuclear, Inc.*, 462 U.S. 36 (1983). See also *supra* note 65.

136. *Id.* at 52.

pected that stockraising and raising crops would entail the extraction of gravel deposits from the land, the congressional purpose of facilitating the concurrent development of both surface and subsurface resources is best served by construing the mineral reservation to encompass gravel."¹³⁷ One may only surmise that if, instead, the government wished to remove gravel and that removal interfered with the contemplated surface use, the Court would have reached a different result.¹³⁸

In a second manner, courts have defined the general intent of the parties as an intent not to destroy the surface.¹³⁹ This approach is necessarily deficient when the surface of the land is void of any apparent usefulness at the time of the severance. Then, perhaps both parties are speculating on the future value of the land for either mineral or surface development. Such cases require the courts to substitute a questionable presumption for the general intent of the parties. Thus, in the absence of a genuinely ascertainable specific intent of the parties to a severance either to preserve the surface or to exploit the minerals, courts should admit the obvious, which is that the parties neither granted nor reserved the substance in question. The only ascertainable general intent in such cases is that the parties deemed the land to be susceptible to joint enjoyment.

Joint enjoyment can best be achieved by balancing the interests of both parties and allowing them to share in the unnamed substance.¹⁴⁰ Both parties then would share an interest in the unnamed substance and anyone wishing to develop it should obtain the right to do so from both parties.¹⁴¹ As a result, profits generated by development will not inure

137. *Id.* at 47.

138. In *Watt*, a company acquired the homestead grants in order to extract gravel from an open pit on the premises. *Id.* at 39.

139. See *supra* notes 86-95 and accompanying text.

140. Alternatively, assigning the unspecified substance to either the mineral or the surface estate could result in a windfall to one party depending on how courts award compensation for surface damages. See Note, *supra* note 88, at 714-15. For a mathematic analysis of the issue, see Note, *supra* note 72, at 118-123. This proposition of sharing in the value of production is not without some precedence. For example, a Texas law requires that money paid for certain minerals reserved by the state, the extraction of which is usually destructive to the surface, be divided with the surface owner in lieu of damages, and further allows the surface owner to negotiate the lease. TEX. NAT. RES. CODE ANN. §§ 53.065-067 (Vernon 1978).

141. As a practical matter, mineral developers often obtain leases or waivers of damages provisions from surface owners, implicitly recognizing the fact that ownership rights are not as exclusive as courts attempt to make them. One writer, addressing a non-legal audience concerning the legal limitation on the obligation to pay for damages for negligence or excessive use, commented that:

[N]owhere else does the practical depart so far from the legal in oil and gas operations, as in the area of payment of damages and surface restoration. Imagine your future as the landman who said, after tearing out 6 acres of kiwis, "That's tough luck Mr. [insert name

solely to the owner of the estate arbitrarily thought to contain the substance. Consequently, those profits will reflect the internalized cost of obtaining the complete right of exploitation.

Additionally, in some situations, existing surface and mineral uses may need to be balanced against each other and any proposed new use. But, regulating competing rights in a reasonable manner is not foreign to our legal system.¹⁴² The production of oil and gas demonstrates an effort to adjust vertical correlative rights between neighbors to a common reservoir by pooling and unitization rules. A similar type of horizontal correlative rights could adjust competing rights to an unspecified substance between owners of severed interests. Also, an appropriate regulatory body could require permits for development aimed at protecting existing uses.¹⁴³ Currently, laws regulate secondary recovery operations for oil and gas, drilling within municipal boundaries, and coal and uranium mining, along with surface reclamation.¹⁴⁴ Once joint ownership is established, the equitable distribution of the resource in question could be achieved with due regard given to balancing competing uses through regulation.

VII. CONCLUSION

Courts have encountered considerable problems in defining the respective rights of mineral and surface owners to unspecified substances under general grants or reservations of minerals. Attempting to determine the elusive, arguably missing, intent of the parties to such a transaction yields inconsistent and unpredictable results. The noted scholar who first expounded the specific/general intent test for ownership, complemented by the recognition of potential liability for surface damage, admitted that the most difficult case possible for determining the intent

of largest California landowner you can think of], but you only own the servient surface estate, and our lawyer says we don't have to pay."

Day, *supra* note 115, at 45.

142. For example, the government somehow must balance two antagonistic interests in Louisiana in the near future. In the 1970's, the federal government acquired the surface rights on a 17,000 acre national wildlife refuge. However, oil companies previously leased the mineral rights and now are drilling on the refuge. As a result, a rare type of woodpecker is about to become extinct. In whatever way one characterizes the intent of the parties to the various transactions, certainly some balance can be reached between the interests of protecting a natural habitat and exploiting natural resources. *See generally, Petroleum Producers Punch Holes in Woodpecker Refuge*, Audubon Action, Oct. 1985, at 5.

143. *See Olpin, supra* note 49, at 792-97, 881-87 for a proposed property regime to regulate ownership and development rights in geothermal resources.

144. *See generally Brooks II, supra* note 108, at 1262-65; *Lopez, supra* note 33, at 1024 n.95, 1029-30.

of the parties would be the situation where a new substance is discovered which is found dispersed through, or immediately beneath, the topsoil and which requires extensive excavation for recovery.¹⁴⁵ Oil shale and tar sands embody this difficult case. Are they synthetic sources of energy or natural resources? Are they minerals? If so, who possesses the right to exploit them? Should compensation be paid for that right? Certainly, the temptation to deal with these resources using existing jurisprudence is alluring. Present jurisprudence, however, does not effectively and equitably clarify the relationship among opposing owners and should not be extended to this complex case. Perhaps even its present application to coal and uranium should be reconsidered. Questions as to ownership generate title uncertainties and frustrate developmental efforts. While the capacity to commercially develop these resources may be years away, when that opportunity materializes, the legal system should be prepared to deal with potential ownership disputes in a logical, consistent, and equitable fashion without vacillation. Undoubtedly, capturing these sources of energy will be regulated pervasively because of environmental impacts. Perhaps the equilibrium reached between environmental concerns and the need for energy sources could be translated into an equilibrium among owners of the surface and subsurface estates. If regulation fails to provide an equitable solution, the legislative bodies or the courts should be prepared to define the rights of the owners of the surface and subsurface estate by balancing the rights of the parties and equitably apportioning the unnamed substance between them.

145. Kuntz, *supra* note 73, at 115.

